REMARKS

Claims 1 to 58 are pending in the application.

Specification

The informalities pointed out by the examiner have been corrected in the appropriate paragraphs.

Information Disclosure Statement

A proper Information Disclosure Statement is submitted concurrently with the instant amendment.

Claim Objections

The claim dependency of claim 12 has been corrected.

Claim Rejections - 35 U.S.C. 112

Claims 1-58 stand rejected under 35 U.S.C. 112, 1st paragraph, as failing to comply with the written description requirement. The examiner refers to the term "NC-control". It is respectfully submitted that the abbreviation "NC" is widely used in machining technology and refers to numerical control of machining operations. It is believed that examiner is familiar with the term and that he only requests that the term be spelled out.

The claims 1, 35, 45, 52 have been amended accordingly.

Reconsideration and withdrawal of the rejection under 35 USC 112 are respectfully requested.

Rejection under 35 U.S.C. 102

Claims 1 and 35 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Hoshina et al. (US 3,777,587).*

The present invention according to claim 1 defines a rotary machine element for chucking workpieces or tools, the rotary machine element comprising:

at least one functional part adapted to perform at least one of clamping, aligning and centering of a workpiece or a tool and to perform movements into stop positions correlated with at least one of clamping, aligning and centering , which stop positions are nominal stop positions or mechanical terminal stop positions and are functionally correlated;

at least one position sensor configured to detect individual actual position values of the stop positions independently from one another;

wherein the at least one position sensor is located in a control path between the at least one functional part and a numerical control-based control;

wherein the control path is active in positions between the nominal stop positions; the mechanical terminal stop positions; or the nominal stop positions and the mechanical terminal stop positions.

According to claim 35, the invention defines a method for detecting position values of at least one functional part of a rotating machine element for chucking workpieces or tools, the rotating machine element comprising at least one functional part adapted to perform at least one of clamping, aligning and centering of a workpiece or a tool and to perform movements into stop positions correlated with at least one of clamping, aligning and centering , which stop positions are nominal stop positions or mechanical terminal stop positions and are functionally correlated; at least one position sensor configured to detect individual actual position values of the stop positions independently from one another; wherein the at least one position sensor is located in a control path between the at least one functional part and numerical control-based control; wherein the control path is active in positions between the nominal stop positions; the mechanical terminal stop positions; or the nominal stop positions and the mechanical terminal stop positions; the method comprising the steps of:

acquiring actual position values of the at least one functional part; and

based on the actual position values, determining the speed and acceleration of the at least one functional part by means of a numerical control-based control.

The cited prior art reference U.S. 3,777,587 shows a screw driving apparatus for moving a work table or cutter table of a machine (col. 1, lines 6-14). The worktable 1 is to be moved along a guide rail 8. For this purpose, by means of the motor 3 a drive screw 4 is driven in rotation. The drive screw 4 extends through a nut 7 that is mounted on the base 6. By means of pole pieces 9, 10 forming the threaded portion of the nut 7 and the coil 12 between the poles 9, 10, a magnetic flux is generated passing through the poles 9, 10 and the drive screw 4. In combination with a special thread arrangement, the

disclosed configuration provides a steady and balanced position of the nut 7 on the screw 4 so that the table 1 can be moved linearly in the axial direction by the drive motor 3. Note that the nut 7 is a stationary part connected to the base 6; it cannot move and it cannot assume any stop positions. The screw 4 is moved relative to the nut 7.

In order to overcome inaccuracies of the position control that may occur by inertia forces, the nut 7 of Fig. 3 is composed of three pole pieces 20, 21, 22 and coils 23, 24, 25; 26, 27, 28 wound between the pole pieces 20, 22 and the center piece 21, respectively. The coils 24, 27 are connected to a variable resistor WR and a resistor R and constitute a bridge circuit whose input signal is an alternating current signal and whose output signal is fed to a displacement detector circuit D. If the bridge circuit becomes unbalanced, the detector circuit D generates an output signal that is fed to the control circuit 31. The control circuit 31 controls coils 25 and 28 by means of a direct current power source 32 so that displacements of the part 5 can be compensated (see col. 3, line 26, to col. 4, line 22).

The coils 24, 27 are detection means for detecting a change in inductance by displacement of part 5. The coils 25 and 28 compensate the position of the displaced part 5 by being energized by circuit 31. This arrangement including the circuit 31 has nothing in common with an NC control. It is a simple electromagnetic feedback control. Note that mention is made of a numerical control system provided for controlling the motor 3 (see col. 2, lines 38-45); the detection system comprising coils 24, 27 and circuit 31 has nothing to do with such NC system. This is clear also from the fact that the coils are not positioned within a control and/or regulating path between the functional part and the NC system.

Claim 1 is not anticipated by or obvious in view of the cited reference.

The cited prior art reference also does not anticipate the method as claimed in claim 35. It is important in connection with the claimed method that not only the actual position values of the functional parts 3 to 5 are detected but also speed and acceleration of the functional parts 3 to 5 are determined by the NC system. In the cited prior art reference, the coils 23 to 28 and the circuit 31 only determined the position of the threaded screw 4 and of the table 1, 5 relative to the nut 7 but not the speed and acceleration of the table.

Claim 35 is therefore not anticipated by or obvious in view of the cited reference.

Claims 1 and 35 stand rejected under 35 U.S.C. 102(b) as being anticipated by

Berstein et al. (US 4,799,839).

This prior art reference also does not show a rotary machine element for chucking tools or workpieces. This reference shows a method and device for performing rotary broaching of workpieces. The workpiece 1 to be machined is clamped within the head stocks 29, 30 by means of chucks (col. 6, lines 14-18; lines 44-54). The present invention relates to such machine elements for chucking (clamping) workpieces and their control by an NC system. The cited prior art reference however does not show the machine elements for chucking (clamping, aligning, centering the work piece) to have stop positions that are detected by position sensors provided in the control path from the functional parts to the NC system. The cited prior art only shows that the motors 31, 32 for driving the spindle 16 while machining the work piece and the motor 40 for moving the head stocks 29, 30 relative to one another are connected to a central machine control 33.

The present invention however deals with the particular problems that arise in regard to aligning and clamping a workpiece within a chuck; the problems encountered are explained in detail in paragraphs 0004 to 0007 of the instant specification. Accordingly, the chuck has, depending on the workpiece requirements, generally several functions that can be performed during the chucking process only sequentially. Such functions are, for example, centering, clamping as well as radial and axial as well as rotary aligning of the workpieces. These functions are carried out by the corresponding functional parts such as centering tips, alignment elements and clamping elements. The present invention relates to the machine elements for chucking workpieces and tools and to a method for chucking workpieces or tools.

The cited prior art reference does not concern such problems relating to centering, aligning and clamping of workpieces. The embodiments presented in this prior art reference do not relate to a device for clamping workpieces but to controlling a tool with which the workpieces 1 are to be machined. This has nothing in common with the invention as claimed in claims 1 and 35.

The cited prior art reference is in fact a measure for the inventive step involved in the present invention. With respect to the rotary movement and advancing of the tool, special measures are provided by *Berstein et al.* but not with respect to clamping of the

workpiece. This is supporting evid nce that the substance of claims 1 and 35 is not anticipated or obvious in view of the cited prior art reference.

Claims 1, 2, 5, 12-23, 26, 27, 33-43, 54-58 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Carpenter et al. (US 4,431,954).*

The cited prior art reference relates to motor vehicle windshield wipers and has nothing in common with a rotary machine tool for chucking workpieces or tools. The control 23 disclosed in this prior art reference is not an NC control. The control 23 also does not have the task of determining the speed and acceleration of the windshield wipers 12, 15 (functional parts) as claimed in claim 35.

Contrary to examiner's assertion, *Carpenter et al.* does not show a tool carrier (claim 26); a radial facing slide tool (claim 27); programming and processing as well as saving in data processing devices or NC device (claim 38); providing a software program and data processing devices (claims 39, 40); length measurement (claim 41); magnetostriction (claim 43); nominal position values and activating control when actual values surpass or drop below a limit (claim 54); calibration by reference movement course (claims 57, 58).

The cited prior art cannot anticipate the subject matter as claimed in claims 1 and 35 and its dependent claims. Reconsideration and withdrawal of the rejections under 35 USC 102 are respectfully requested.

Rejection under 35 U.S.C. 103

Claims 3, 4, 6-11, 24, 25, 28-32, 34, 44-58 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Carpenter et al. (US 4,431,954)* and *Ishizuka et al. (US 4,087,890).*

As pointed out above *Carpenter et al.* does not show a device for chucking workpieces or tools but a windshield wiper arrangement. The secondary reference shows a compound lathe having an advantageous arrangement of the headstock. According to col. 3, the headstock is movably arranged on guide ways and has an integrated drive for energy supply and is designed for machining long workpieces. The compound lathe has a high cuttings removal rate and is provided with an NC system for the headstock and the saddle. Moreover, the compound lathe is provided with a workpiece gripping device that changes the workpieces in and out of the chuck 26.

The present invention relates to rotary machine elements for chucking workpieces and tools and to a method for chucking workpieces or tools. The reference *Ishizuka et al.* - like *Berstein et al.* - does not concern problems relating to centering, aligning and clamping of workpieces. The comments made in regard to *Berstein et al.* apply here as well. The embodiments presented in *Ishizuka et al.* do not relate to a device for clamping workpieces by NC control but only to NC control of driving servo motors for the headstock and the saddle. This has nothing in common with the invention as claimed in claims 1 and 35 directed to a rotary machine element for chucking workpieces or tools and a correlated method.

Reconsideration and withdrawal of the rejection under 35 USC 103(a) are respectfully requested.

CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned would appreciate a phone call or e-mail from the examiner to discuss appropriate amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on June 23, 2004,

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